Concrete Building Block *and* Brick

Concrete Block Office Building, American Sheet & Tin Plate Co., Gary, Ind.

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Portland Cement Association

Concrete Building Block and Brick

A Guide to Good Practice

The object of this booklet is to give the fundamental principles underlying the manufacture of concrete building block and brick, so that these worthy building units may receive proper recognition.

At times when there are transportation difficulties, concrete block come in for special attention as a building unit because of the many

One of the buildings of the Minnesota Steel Co. plant at Duluth, Minn., constructed of Hydro-Stone block.

concrete products plants conveniently located throughout the country. These fortunate locations, together with the fact that the great bulk of materials entering into concrete may be found locally, make it possible to secure a high-class building material, requiring little or no transportation, near practically any building site.

Merits of Concrete Block

Concrete block, made of suitable materials correctly proportioned by processes that have been proved good practice, possess the desirable qualities of utility, attractiveness and permanence. Like monolithic concrete, concrete block and brick, if well made, grow stronger with

age, and concrete brick or block buildings, like those of monolithic concrete, are fireproof, rotproof, ratproof, sanitary, and require the minimum of maintenance.

Concrete block, and in some cases concrete brick, are particularly applicable to the construction of many types of buildings that have been and are still needed to complete the Government's war building program. Factories, machine shops, power houses, houses, apartment buildings, all kinds of farm buildings, which includes silos, are built of concrete block or concrete brick to the utmost satisfaction of the

Factory of the Knechtel Furniture Co., Hanover, Ontario, built of Ideal concrete block.

builder or owner. Representative structures built of concrete block or brick, illustrated in this booklet, support the foregoing statement.

Importance of Good Workmanship

Nearly everyone knows that concrete is made by mixing portland cement, sand, pebbles or crushed stone and water, placing the material in some kind of a form and allowing it to remain undisturbed while hardening. Many persons, however, do not appreciate the fact that some concrete varies greatly in quality from other concrete and that for good concrete, whether in the form of block, brick or monolithic, best results are obtained only when suitable materials are correctly

proportioned, mixed, placed and cured or hardened under proper conditions.

Materials Used

In the manufacture of concrete block or brick, only portland cement complying with the specifications of the American Society for Testing Materials should be used. The sand and pebbles or broken stone, which are called fine and coarse aggregates, should be clean, well graded and free from clay, loam or organic matter. Sand is considered

Concrete block wall construction by use of a type of interlocking concrete block made by the Roman Concrete Products Co., Pittsburgh, Pa.

as that material which will pass a ¼-inch mesh screen and which will be graded downward from that size to very fine particles. If the only sand available contains such objectionable materials as clay, loam or organic matter, it should be washed before using in a concrete mixture. Coarse aggregate usually consists of pebbles, crushed trap rock, granite, limestone or crushed blast furnace slag. It also must be well graded and free from the impurities or foreign materials above mentioned. In general, all coarse aggregate used for concrete block should be retained on a ¼-inch mesh screen and should pass a ¾-inch mesh screen.

Water used in concrete mixtures must be clean, free from mud, silt, alkali, acids, oils or other foreign materials such as discharges from factories, sewers, etc. The quantity of water used in concrete is of great importance; that is, for certain mixtures there is a definite quantity of water that will produce the best possible concrete to secure from that mixture. However, the various machines and processes of manufacturing block and brick do not always permit use of exactly the most desirable quantity of water.

Consistency of Concrete

The strongest concrete will result from using only sufficient water to produce a stiff, plastic mixture. As some block are made, such a mixture cannot be used, and it is not expected that the block made

One of a number of concrete block buildings built of Hydro-Stone by the Loyal Order of Moose at its industrial community, Mooseheart, Ill.

from a relatively dry mixture of concrete will be as strong as that made from a stiff plastic mixture. Nevertheless many block and brick manufacturers use less water than would be possible with the type of machine employed. Enough water should be used so that the concrete will approach that limit of plastic state which will just prevent the block from changing its shape when removed from the mold or machine. Better results would in general be secured if mixing water, when used, were always at a temperature higher than 60 degrees. If water colder than 60 degrees is used, setting of the cement, and consequently hardening of the concrete, is considerably retarded.

Variations in Surface Texture and Finish

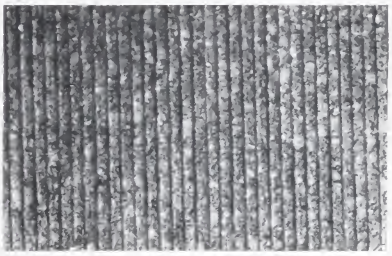
With the greatly increased popularity of concrete as a building material there have been developed many ways of giving to concrete block and brick very attractive surfaces. A great deal of objection was raised to the earlier and common type of rock-faced block which attempted to imitate stone, but which deceived no one. This type is not recommended. Various surface finishes may readily be given to concrete block or brick, depending on the type of machine used, the materials of which the concrete is composed, the manner in which concrete is placed in the molds and the final treatment given to the finished block or brick after removed from the machine. Both block

A good example of rock-faced block, a product of the Anchor Concrete Stone Co., Columbus, Ohio.

and brick may be plain, tool-faced, paneled, have an exposed aggregate surface, and so on.

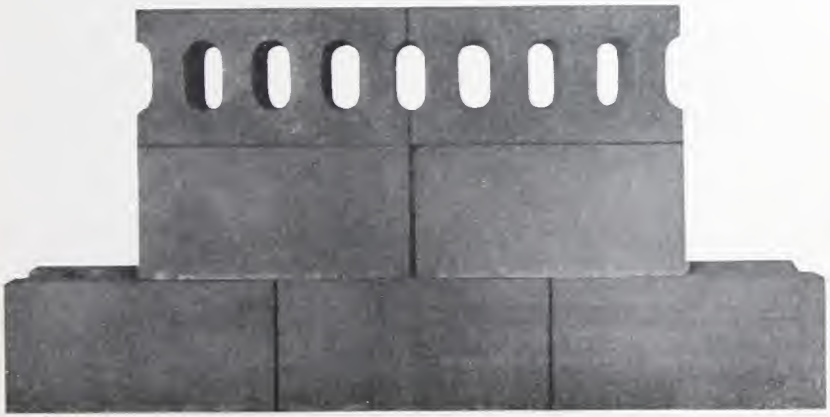
The easiest method of obtaining a plain face block is to use a smooth face plate in the machine and work the concrete back from the plate while placing, so that no coarse aggregate will show on the face of the finished block. Such a surface will be smooth but dull looking, although it can be improved by spraying the face of the green block with a fine jet of water from a nozzle, which will wash away the film of cement on the surface and expose some of the aggregate particles; or the same aggregate exposure can be secured by brushing the surface with a stiff fiber brush after the concrete has obtained a certain degree of hardness, or by rubbing the face with carborundum brick.

Fine hair checking or crazing may occur on block with smooth faces. This, however, will not be noticeable if the block faces are tooled so as to form either horizontal or vertical ribbed lines on the exposed surface. Machines for this purpose have been developed, and block are often treated this way after the concrete has hardened for several weeks.



An example of one of several tooled finishes that may be given to concrete block.

By far the most attractive surface finishes are those which are, in large part, prearranged when mixing and placing the concrete; that is, selected aggegates are used instead of common sand, at least for the face of the block or brick, these materials being chosen principally because of their color. For example: instead of using ordinary sand, white sand and marble chips or granite screenings, crushed feldspar, mica and mica spar, crushed slag, garnet sand and similar colored rock materials are used as aggregates. Mixtures are prepared and placed in the usual way, then when the concrete has reached the proper



View showing plan and face of the Brandell concrete block.

degree of hardness for whatever future treatment is to be applied, the surface of the block is gone over in one of several ways to secure the desired final effect. This may consist of scrubbing with bristle

brush and water while the concrete is still green, or scrubbing with brush and an acid solution consisting of 1 part hydrochloric acid to 3 or 4 parts of water, to remove the cement coating of the surface aggregate particles.

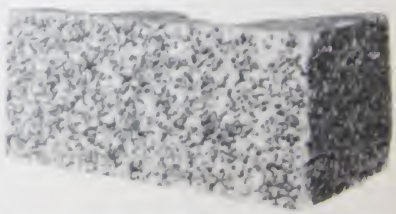
A type of surface finish secured on McIntyre hollow concrete tile solely by the form of the mold.

Variations in the texture and color of the surface can be secured by different combinations of different colored aggregates. Yellow and white marble chips or gray granite screenings and black crushed slag combined are examples. Often white portland cement is used with selected aggregates, such as white marble chips, feldspar, slag, etc. In all attempts to secure a distinctive surface finish to concrete block or brick, freakish effects should be avoided. It should be remembered that concrete is a distinctive building material and should be handled accordingly.

Type of block manufactured by the Flexo Concrete Mold Co., also showing special surface finish.

Strength of Concrete Block and Brick

The strength of concrete building block and brick depends upon the quality of the materials and the manner in which they are used, together with proper methods of curing or hardening the finished product, so that the cement will develop its greatest strength or bonding action during the process of setting or hydration. Both warmth and moisture are necessary to this end, so the too rapid evaporation of water that was used in the concrete block or brick when manufactured must be prevented. It is necessary to pro-



Corner stone block of the Hydro-Stone type, showing special face obtained by using black and white granite as aggregate.

tect the concrete from sun and drying winds, as circulation of air about the block or brick will cause rapid evaporation of moisture from the concrete before the necessary chemical changes or transformation of the cement has been completed. It matters but little how moisture and warmth are applied so long as the combined condition is secured. In commercial block or brick manufacture, however, these conditions are usually obtained in steam curing rooms or chambers. Sometimes, however, the products are water cured by water spray. The spray should not be applied so as to strike the fresh products with any force as it would then tend to mar the green concrete. By the use of certain types of nozzles intended for the purpose, a floating mist or fog of spray can be produced in the curing rooms or tunnels,

Flour mill of Ideal concrete block, built by the Omaha Concrete Stone Co., Omaha, Neb.

which will keep the air saturated with moisture to the required degree for proper hardening of the concrete. When the temperature of the curing room or chamber drops below 50 degrees, wet steam can be employed to advantage, and the best way of introducing steam into the curing rooms or chambers is through a perforated pipe laid in a trough of water in the floor of the rooms, with the perforations downward, the pipe being completely submerged. Steam thus passing through the water to the interior of the room becomes saturated with moisture. Temperatures in the curing or hardening room should range from 100 to 120 degrees. Moist steam obtained as above indicated does not dry out the block but maintains the required degree of moisture and warmth. Ordinarily block or brick should remain in the

curing rooms from three to four days, depending on temperature and weather conditions. At the end of that time they may be removed to a storage yard or shed where they should remain from twenty to thirty days before being laid up in building walls.

Determining Strength by Careful Tests

Every block or brick manufacturer should have tests made on his products to determine their strength. This can be arranged for either with commercial or college laboratories. In this way the manufacturer obtains knowledge as to the strength of his product and thereby definite data for comparison with the product of other manufacturers.

One type of wall secured by laying up Hydro-Stone block, resulting in continuous air space in both directions.

Types of Block

Concrete block are usually made with an air space or spaces for the purpose of obtaining insulation. Many patented types of block or types of wall using certain types of block have been used or advocated. Providing a dead space in the wall of the building either by making blocks with air spaces or by laying the blocks so that a double wall results, insulates the wall and the building interior is less affected by changes of outdoor temperature.

This insulation, if effectively secured, prevents condensation on the interior of block walls.

Various details showing the interlocking principle of the Myer concrete block.

Types of Machines or Molds

Machines or molds now on the market for manufacturing concrete block might be classified in groups with respect to the manner in which concrete is tamped or compacted in the mold. This in turn naturally permits a classification with respect to the consistency of concrete used. However, the design of the block and the manner in which a machine is operated will determine to a considerable extent

Concrete block sub-station of the Great Northern Power Co., Duluth, Minn.

how much water can be added to semi-dry concrete toward the point of obtaining a concrete of stiff, plastic consistency for block manufacture. Different operators using the same machine will use concrete varying in consistency dependent upon their skill and experience in manufacturing concrete products.

One process of manufacture permits the use of a wetter concrete than any of the others and in this process the machines or molds employed use a more than ordinarily wet concrete. Mixtures containing more water than that which will produce a stiff plastic consistency should be used only in sand molds, as such molds will take

Concrete block railroad station, Mooseheart, Ill.

up quickly the excess water. In those methods of manufacture requiring the use of iron or steel molds, the least amount of water possible should be used to obtain the results desired.

A list of manufacturers of concrete block machines or molds is given elsewhere in this booklet. Those intending to engage in the manufacture of concrete products should, before taking up such manufacture, obtain catalogues from the various manufacturers of concrete machinery and study the possibilities of the various machines

Locomotive shops of the Elgin, Joliet & Eastern Railway Co., Joliet, Ill., built of Hydro-Stone block.

Concrete block were used in developing the model city of Morgan Park, Duluth, Minn., shown above. Walks, streets and alleys also are of concrete.

with particular reference to the standard practice in concrete block manufacture as laid down by the specifications of the American Concrete Institute, adopted April 10, 1917. Intelligent decision can then be made on the process or type of machine to be chosen.

Second Baptist Church, Little Rock, Ark., built of concrete block. Fire destroyed interior of building March 28, 1918, with no damage to walls, as shown above.

A common size for concrete building block is 8 inches thick by 8 by 16-inch face, although there are machines designed to make block 10 and 12 inches wide, these widths determining the thickness of the finished building wall. Other lengths sometimes found are 18, 20, 24 and 32 inches. In general, concrete block machines are equipped to manufacture fractional blocks consisting of ¼, ½ and ¾ lengths. These are required to finish out corners and to break joints. The

Concrete block barn, silo and barnyard lot wall.

actual face dimensions are usually ¼ inch less than stated. This is to allow for mortar joints so that when the block are laid up with joints equivalent to this ¼-inch allowance, the surface area occupied by the block in the wall will be, for example, 8 by 16 inches.

Specifications

The following specifications, known as American Concrete Institute Standard No. 10, are standard specifications and building regulations for the manufacture and use of concrete architectural stone, building block and brick, and were adopted by the American Concrete Institute April 10, 1917. If these specifications are followed in the manufacture of concrete block, brick and architectural stone, a uniformly high class product may always be expected.

AMERICAN CONCRETE INSTITUTE STANDARD No. 10

Adopted by Letter Ballot, April 10, 1917

STANDARD SPECIFICATIONS AND BUILDING REGULATIONS FOR THE MANUFACTURE AND USE OF CONCRETE ARCHITECTURAL STONE, BUILDING BLOCKS AND BRICK

1. Concrete architectural stone and building blocks for solid or hollow walls and concrete brick made in accordance with the following specifications and meeting the requirements thereof may be used in building construction.

2. Tests.—Concrete architectural stone, building blocks for hollow and solid walls and concrete brick must be subjected to (a) Compression and (b) Absorption tests. All tests must be made in a testing laboratory of recognized standing.

3. Ultimate Compressive Strength.—(a) Solid concrete stone, building blocks and brick. In the case of solid stone, blocks and brick, the ultimate compressive strength at 28 days must average not less than fifteen hundred (1,500) lb. per. sq. in. of gross cross-sectional area of the stone as used in the wall and must not fall below one thousand (1,000) lb. per sq. in. in any test.

(b) Hollow and two piece building blocks. The ultimate compressive strength of hollow and two piece building blocks at 28 days must average one thousand (1,000) lb. per sq. in. of gross cross-sectional area of the block as used in the wall, and must not fall below seven hundred (700) lb. per sq. in. in any test.

4. Gross Cross-Sectional Areas.—(a) Solid concrete stone, blocks and brick. The cross-sectional area shall be considered as the minimum area in compression.

(b) Hollow building blocks. In the case of hollow building blocks the gross cross-sectional area shall be considered as the product of the length by the width of the block. No allowance shall be made for the air space of the block.

(c) Two piece building blocks. In the case of two piece building blocks, if only one block is tested at a time, the gross cross-sectional area shall be regarded as the product of the length of the block by one-half of the width of the wall for which the block is intended. If two blocks are tested together, then the gross cross-sectional area shall be regarded as the product of the length of the block by the full width of the wall for which the block is intended.

5. Absorption.—The absorption at 28 days (being the weight of the water absorbed divided by the weight of the dry sample) must not exceed ten (10) per cent when tested as hereinafter specified.

6. Samples.—At least six samples must be provided for the purpose of testing. Such samples must represent the ordinary commercial product. In cases where the material is made and used in special shapes and forms too large for testing in the ordinary machine, smaller specimens shall be used as may be directed. Whenever possible the tests shall be made on full sized samples.

7. Compression Tests.—Compression tests shall be made as follows: The samples to be tested must be carefully measured and then bedded in plaster of paris or other cementitious material in order to secure uniform bearing in the testing machine. It shall then be loaded to failure. The compressive strength in pounds per square inch of gross cross-sectional area shall be regarded as the quotient obtained by dividing the total applied load in pounds by the gross cross-sectional area, which area shall be expressed in square inches computed according to article 4.

When such tests must be made on cut sections of blocks, the pieces of the block must first be carefully measured. The samples shall then be bedded to secure uniform bearing, and loaded to failure. In this case, however, the compressive strength in pounds per square inch of net area must be obtained and the net area shall be regarded as the minimum bearing area in compression. The average of the compressive strength of the two portions of blocks shall be regarded as the compressive strength of the samples submitted. This net compressive strength shall then be reduced to compressive strength in pounds per square inch of gross cross-sectional area as follows:

Hydro-Stone block residence in Evanston, Ill. Block faced with black granite.

The net area of a full sized block shall be carefully calculated and the total compressive strength of the block will be obtained by multiplying this area by the net compressive strength obtained above. This total gross compressive strength shall be divided by the gross cross-sectional area as figured by article 4 to obtain the compressive strength in pounds per square inch of gross cross-sectional area.

When testing other than rectangular blocks, great care must be taken to apply the load at the center of gravity of the specimen.

8. Absorption Tests.—The sample shall be first thoroughly dried to a constant weight at a temperature not to exceed two hundred and twelve (212) degrees Fahrenheit, and the weight recorded. After drying the sample shall be immersed in clean water for a period of forty-eight hours. The sample shall then be removed, the surface water wiped off, and the sample re-weighed. The percentage of absorption shall be regarded as the weight of the water

absorbed divided by the weight of the dry sample multiplied by one hundred (100).

9. Limit of Loading.—(a) Hollow walls of concrete building blocks. The load on any hollow walls of concrete blocks, including the superimposed weight of the wall, shall not exceed one hundred and sixty-seven (167) lb. per sq. in. of gross area. If the floor loads are carried on girders or joists resting on cement pilasters filled in place with slush concrete mixed in proportion of one (1) part cement, not to exceed two (2) parts of sand and four (4) parts of gravel or crushed stone, said pilasters may be loaded not to exceed three hundred (300) lb. per sq. in. of gross cross-sectional area.

(b) Solid walls of concrete blocks. Solid walls built of architectural stone, blocks or brick and laid in portland cement mortar or hollow block walls filled with concrete shall not be loaded to exceed three hundred (300) lb. per sq. in. of gross cross-sectional area.

Concrete block residence, Decatur, Ind., in which granite-faced Ideal concrete block were used.

10. Girders and Joists.—Wherever girders or joists rest upon walls in such a manner as to cause concentrated loads of over four thousand (4,000) lb. the blocks supporting the girders or joists must be made solid for at least eight (8) in. from the inside face of the wall, except where a suitable bearing plate is provided to distribute the load over a sufficient area to reduce the stress so it will conform to the requirements of article 9.

When the combined live and dead floor loads exceed sixty (60) lb. per sq. ft., the floor joists shall rest on a steel plate not less than three-eighths (3/8) of an inch thick and of a width one-half to one inch less than the wall thickness. In lieu of said steel plate the joists may rest on a solid block which may be three (3) or four (4) in. less in wall thickness than the building wall, except in instances where the wall is eight (8) in. thick, in which cases the solid blocks shall be the same thickness as the building wall.

11. Thickness of Walls.—(a) Thickness of bearing walls shall be such as will conform to the limit of loading given in article 9. In no instance shall bearing walls be less than eight (8) in. thick. Hollow walls eight (8) in. thick shall not be over sixteen (16) ft. high for one story or more than a total of twenty-four (24) ft. for two stories.

(b) Walls of residences and buildings commonly known as apartment buildings not exceeding four stories in height, in which the dead floor load does not exceed sixty (60) lb. or the live load sixty (60) lb. per sq. ft., shall have a minimum thickness in inches as shown in Table 1.

TABLE 1

No. of Stories	Basement, in.	First Story, in.	Second Story, in.	Third Story, in.	Fourth Story, in.
1	8	8	..	..	..
2	10	8	8	..	..
3	12	12	10	8	..
4	16	12	12	10	8

Small garage built of Ideal rock-faced concrete block, corners and window trim being of white-faced plain block.

12. Variation in Thickness of Walls.—(a) Wherever walls are decreased in thickness the top course of the thicker wall shall afford a solid bearing for the webs or walls of the course of the concrete block above.

13. Bond and Bearing Walls.—Where the face wall is constructed of both hollow concrete blocks and brick, the facing shall be bonded into the backing,

either with headers projecting four (4) in. into the brick work, every fourth course being a header course, or with approved ties, no brick backing to be less than eight (8) in. thick. Where the walls are made entirely of concrete blocks, but where said blocks have not the same width as the wall, every fifth course shall overlap the course below by not less than four (4) in. unless the wall system alternates the cross bond through the wall in each course.

14. Curtain Walls.—For curtain walls the limit of loading shall be the same as given in article 9. In no instance shall curtain walls be less than eight (8) in. in thickness.

Dairy building built of Myer interlocking concrete block covered with stucco.

15. Party Walls.—Walls of hollow concrete blocks used in the construction of party walls shall be filled in place with concrete in the proportion and manner described in article 9.

16. Partition Walls.—Hollow partition walls of concrete blocks may be of the same thickness as required in hollow tile, terra cotta or plaster blocks for like purposes.

NOTE.—Much valuable information on the subject of concrete block, brick and other cast concrete products can be found in a book entitled "Concrete Stone Manufacture," by Harvey Whipple, published by the Concrete—Cement Age Publishing Co., Detroit. This book may be obtained from the publishing company mentioned for [redacted] *$1.50*

MANUFACTURERS OF CONCRETE BLOCK MACHINES

Anchor Concrete Stone Co., Columbus, Ohio.

Baute Concrete Machine Co., 402 West Main Street, Benton Harbor, Mich.

Brandell Co., Union Central Tower, Cincinnati, Ohio.

Century Cement Machine Co., Rochester, N. Y.

W. E. Dunn Manufacturing Co., 410 Twenty-fourth Street, Holland, Mich.

Eberling Machinery Co., Williamson Building, Cleveland, Ohio.

Ferguson Synstone Co., Waterloo, Iowa.

Flexo-Concrete Mold Co., Cedar Rapids, Iowa.

Francis Machinery Co., 5 Market Street, St. Louis, Mo.

Hayden Automatic Block Machine Co., 112 West Broad Street, Columbus, Ohio.

Helm Brick Machine Co., Cadillac, Mich.

Hydro-Stone Co., 231 Insurance Exchange, Chicago, Ill.

Ideal Concrete Machine Co., 1304 Monmouth Avenue, Cincinnati, Ohio.

Kramer Automatic Tamper Co., Peoria Heights, Ill.

M. & M. Concrete Machinery Co., Indianapolis, Ind. Cleveland, O.

Multiplex Concrete Machine Co., Elmore, Ohio.

Northwestern Steel & Iron Works, Eau Claire, Wis.

Peters-Eastman-Greer Co., Indianapolis, Ind.

Zagelmeyer Cast Stone Block Machinery Co., 81 Crump Avenue, Bay City, Mich.

Concrete block are adaptable to housing developments where large numbers of buildings are needed quickly. The above houses have been finished with stucco coat.

Six-apartment building at Ottawa, Ontario. Ten-inch Ideal block used in first story, eight-inch for the remainder.

Automobile warehouse at Kensington, Pa. Built of Helm block, in 1917.

Concrete Brick

Adaptability of Concrete Brick

Concrete brick are suitable for many classes of structures. They have ample strength and can be made of any required density. Variations in density are sometimes necessary in order to insure firm bonding with mortar when laid up in the wall. Varying degrees of density are secured by varying the grading of the aggregate and the amount of cement used within certain limits. Like concrete block, concrete brick may also be faced. Facings vary in thickness from 1/16 inch to 1 inch or more and can be of a variety of colors obtained in a manner similar to that already described when discussing surface finish of concrete block on page 6.

Concrete block foundation and concrete brick walls. House at Crawford, Neb. Walls are double and surface finish was secured by using white cement and marble screenings.

If the waterproof qualities of the concrete brick wall are to depend on the facing of the brick, and if the body of the brick is made slightly porous to afford a better bond with the mortar joints, then the face should be deep enough to extend back of the line of a raked joint, if such joints are to be used in the work.

Principles of Manufacture

The same general rules apply to the manufacture of concrete brick as apply to the manufacture of concrete block, although the aggregate ranges smaller, 3/8 inch usually being the maximum. Different proc-

esses are used to make concrete brick. These range from pressing a suitable mortar into molds or compacting the mixtures in machines exerting great pressure on a stiff, plastic or semi-dry mixture of concrete. The pressure process produces, with properly proportioned concrete, a very dense, strong brick, comparing favorably in appearance and quality with the best brick manufactured of any other material.

Concrete products manufacturers will profit most by making concrete products of high quality. Neither cement nor labor should be spared to secure proper density, strength, curing and appearance.

When purchasing any kind of machinery it is well to bear in mind that price is not necessarily a measure of quality or desirability. A careful consideration should be given to the merits of a machine as well as to its price. In using semi-dry mixtures of concrete, considerable tamping must be done or considerable pressure exerted to compact materials into a homogeneous mass. The same applies to stiff, plastic mixtures, and with such processes excellent results will be obtained when the products are cured under the conditions of moisture and warmth described on page 9.

MANUFACTURERS OF CONCRETE BRICK MACHINES

Besser Manufacturing Co., Alpena, Mich.

Concrete Machine Corporation, Securities Bldg., Des Moines, Iowa.

W. E. Dunn Manufacturing Co., 410 Twenty-fourth Street, Holland, Mich.

Helm Brick Machine Co., Cadillac, Mich.

Northwestern Steel & Iron Works, Eau Claire, Wis.

Peerless Brick Machine Co., Minneapolis, Minn.

Raber & Lang Manufacturing Co., Kendallville, Ind.

Shope Brick Co., Portland, Ore.

Let Us Help You

The Cement Products Bureau of the Portland Cement Association devotes its efforts to helping those manufacturing concrete block, brick, drain tile, sewer pipe and other concrete products to improve methods of manufacturing and even assisting where possible in developing markets or helping to solve marketing problems. Such services as the Bureau can render are yours for the asking.

Concrete Drain Tile
Concrete Sewer Pipe
Concrete Pressure Pipe
Cement Stave Silos
Concrete Fence Posts

Are concrete products for which there is a large and growing demand. Many manufacturers of concrete building block and brick might profitably add one or more of the above to their plant output.

Our booklets

Concrete Drain Tile for Land Drainage
Concrete Sewers
Concrete Pressure Pipe
Cement Stave Silos, and
Concrete Fence Posts

will suggest the possibilities in these fields.

If interested in taking up the manufacture of any of these products, ask our **Cement Products Bureau** to confer with and help you.

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